

CLAIMS

- 1 1. A system for servicing household appliances, the system including:
 - 2 A. one or more monitoring subsystems associated with the one or more
 - 3 appliances, each monitoring subsystem
 - 4 i. monitoring the operations of a given appliance and retaining as
 - 5 ii. functional data information relating to the functioning of the
 - 6 iii. appliance,
 - 7 iv. analyzing the functional data and determining if the appliance
 - 8 v. is operating properly or in need of attention, and
 - 9 vi. transmitting a message indicating that the appliance requires
 - 10 vii. attention, and
 - 11 B. a center for receiving the messages sent by the monitoring subsystems,
 - 12 the center contacting the users of the associated appliances to inform
 - 13 them that the appliances require attention.
- 1 2. The system of claim 1 wherein each monitoring subsystem
 - 2 a. determines if the associated appliance requires immediate attention,
 - 3 b. produces alarm messages when immediate attention is required, and
 - 4 c. produces warning messages when other than immediate attention is
 - 5 required.
- 1 3. The system of claim 1 wherein
 - 2 a. the monitoring subsystem sends the functional data or aggregations of the data
 - 3 to the center; and
 - 4 b. the center processes the data to determine if one or more of the appliances
 - 5 requires service.
- 1 4. The system of claim 3 wherein the center
 - 2 i. determines from the received data or messages what attention
 - 3 is required for a given appliance,

- 4 ii. determines, if service is required, whether the user of the
- 5 appliance has a service contract for the appliance, and
- 6 iii. arranges service in accordance with the provisions of the
- 7 contract, if the user has a service contract.

- 1 5. The system of claim 4 wherein the center further
- 2 iv. determines, if preventive maintenance is required, whether the
 - 3 maintenance is performed by the user or an appliance service
 - 4 person,
 - 5 v. determines, if the maintenance is to be performed by a service
 - 6 person, whether the user has a maintenance contract for the
 - 7 appliance and arranges maintenance in accordance with the
 - 8 provisions of the contract, and
 - 9 vi. notifies the user what preventive maintenance is to be done if
 - 10 the maintenance is to be performed by the user.

- 1 6. The system of claim 2 further including
- 2 C. a network over which the monitoring subsystems transmit the
 - 3 messages;
 - 4 D. a gateway connected to the network to receive the messages, the
 - 5 gateway
 - 6 a. transmitting alarm messages to the center as soon as the
 - 7 messages are received, and
 - 8 b. retaining warning messages and transmitting the retained
 - 9 messages at predetermined times or when other transmissions
 - 10 are made to the center.

- 1 7. The system of claim 6 wherein
- 2 i. each monitoring subsystem aggregates the functional data over time into
 - 3 statistical data that relates to the operations of the associated appliance,

- 4 j. the gateway polls each monitoring subsystem to request the statistical
- 5 data,
- 6 k. the gateway transmits the statistical data to the center at predetermined
- 7 times or when other transmissions are made to the center, and
- 8 l. the center includes the statistical data in an analysis of the patterns of use
- 9 and the operations of the appliances.

1 8. The system of claim 7 wherein the center

- 2 i. determines if a given appliance should be replaced based on the
- 3 associated patterns of use,
- 4 ii. recommends at appropriate times the replacement of the appliance
- 5 with one or more appliance models that fit the associated pattern of
- 6 use,
- 7 iii. determines if the user of the given appliance has a replacement
- 8 contract, and if so, arranges for the delivery and installation of the
- 9 replacement appliance model selected by the user.

1 9. The system of claim 1 wherein one or more of the monitoring subsystems are

2 adapters that monitor and analyze the energy consumption of the associated appliances.

1 10. The system of claim 1 wherein one or more of the monitoring subsystems monitor

2 the settings of the associated appliances, and the states of various components of the

3 appliances.

1 11. The system of claim 10 wherein the monitoring subsystems aggregate the

2 functional data into historical data, and use the historical data in the analysis of the

3 operations of the appliances.

1 12. A method for servicing household appliances, the method including the steps of:

- 2 A. monitoring the operations of one or more appliances and retaining
3 as functional data information relating to the functioning of the
4 respective appliances;
5 B. analyzing the functional data at the appliances and determining if
6 the respective appliances are operating properly or in need of
7 attention;
8 C. transmitting to a remote center one or more messages indicating
9 that the appliance requires attention; and
10 D. from the center contacting the users of the associated appliances to
11 inform them that the associated appliances require attention.

- 1 13. The method of claim 12 further including the steps of
2 a. transmitting data from the appliances to the center,
3 b. analyzing the data from all of the appliances in the household to determine if
4 one or more appliances requires service.

- 1 14. The method of claim 13 wherein
2 d. the step of analyzing at the appliance further includes determining if a
3 given appliance requires immediate attention, and
4 e. the step of transmitting one or more messages further includes producing
5 alarm messages when immediate attention is required and producing
6 warning messages when other than immediate attention is required.

- 1 15. The method of claim 14 wherein the step of contacting includes
2 iv. determining from the received messages or an analysis of the
3 data what attention is required for a given appliance,
4 v. determining, if service is required, whether the user of the
5 appliance has a service contract for the appliance, and
6 vi. arranging service in accordance with the provisions of the
7 contract, if the user has a service contract.

1 16. The method of claim 15 wherein the step of contacting further includes

- 2 vii. determining, if preventive maintenance is required, whether the
3 maintenance is performed by the user or an appliance service
4 person,
5 viii. determining, if the maintenance is to be performed by a service
6 person, whether the user has a maintenance contract for the
7 appliance,
8 ix. arranging maintenance in accordance with the provisions of the
9 contract, and
10 x. notifying the user what preventive maintenance is to be done if
11 the maintenance is to be performed by the user.

1 17. The method of claim 13 wherein the steps of transmitting include

- 2 a. transmitting the messages and data over a network to a gateway,
3 b. transmitting alarm messages and associated data from the gateway to the
4 center as soon as the messages are received by the gateway, and
5 c. retaining warning messages and data at the gateway and transmitting the
6 retained messages at predetermined times or when other transmissions are
7 made to the center.

1 18. The method of claim 17 wherein

- 2 i. the step of analyzing further includes aggregating the functional data over
3 time into statistical data that relates to the operations of the associated
4 appliance,
5 ii. the steps of transmitting further include polling from the gateway to
6 request the statistical data and other data and transmitting the requested
7 data to the center at predetermined times or when other transmissions are
8 made to the center, and
9 iii. the method further includes the step of including the statistical data in an
10 analysis of the patterns of use and the operations of the appliances.

- 1 19. The method of claim 18 wherein the method further includes the steps of
2 iv. determining if a given appliance should be replaced based on the analysis
3 of patterns of use,
4 v. recommending replacement appliance models that fit the associated
5 pattern of use,
6 vi. determining if the user of the given appliance has a replacement contract,
7 and if so, arranging for the delivery and installation of the replacement
8 appliance model selected by the user.

1 20. The method of claim 12 wherein the step of monitoring includes monitoring
2 the energy consumption of one or more of the appliances.

1 21. The method of claim 20 wherein the step of monitoring includes monitoring
2 the user-controlled settings of the associated appliances, the ambient environment and the
3 states of various components of the appliances.

1 22. The method of claim 21 wherein the step of analyzing includes aggregating
2 the functional data into historical data, and using the historical data in the analysis of the
3 operations of the appliances.

1 23. The method of claim 22 further including the steps of
2 i. transmitting the functional data to the remote center;
3 ii. analysing the data at the remote center to determine if the one or more
4 appliances are in need of attention.

1 24. A system for servicing household appliances, the system including:
2 A. one or more monitoring subsystems associated with the one or more
3 appliances, each monitoring subsystem
4 i. monitoring the operations of a given appliance and retaining as
5 functional data information relating to the functioning of the
6 appliance,

- 7 ii. analyzing the functional data and determining if the appliance
- 8 is operating properly or in need of attention, and
- 9 iii. transmitting a message indicating that the appliance requires
- 10 attention and the associated data,
- 11 iv. periodically transmitting the functional data,
- 12 E. a c center for receiving the messages and the data sent by the
- 13 monitoring subsystems, the center analyzing the messages and the
- 14 data and contacting the users of the associated appliances to inform
- 15 them of the attention required by the appliances.
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1 25. The system of claim 24 wherein the center analyses the data from all of the
2 appliances in the same household to determine changes in operating environment and
3 uses the results in an analysis of the operations of the various appliance in the same
4 household.

1 26. The system of claim 24 wherein the center analyses the data from a given type
2 of appliance in the various households that report to the center and uses the results in an
3 analysis of the operations of that type of appliance in each of the households.